

AMENDMENTS TO THE CLAIMS

1-8. (Cancelled)

9. (Currently Amended): A polycrystalline silicon film on a substrate, the polycrystalline film containing metal of which density ranges 2×10^{17} to 5×10^{19} atoms/cm³, and an electrical conductivity activation energy between 0.52eV and 0.71eV, the polycrystalline silicon film comprising a plurality of needle-shaped silicon crystallites, wherein the polycrystalline silicon film is formed by crystallizing an amorphous silicon film containing the metal by thermal treatment and applying an electric field wherein the metal is a catalyst for metal induced crystallization of amorphous silicon.

10. (New): The polycrystalline silicon film according to claim 9, wherein the metal includes one of nickel (Ni), gold (Au) and cobalt (Co).

11. (New): The polycrystalline silicon film according to claim 9, wherein the metal works as a catalyst during the crystallization.

12. (New): The polycrystalline silicon film according to claim 9, further comprising a buffer layer between the substrate and the polycrystalline silicon film.

13. (New): The polycrystalline silicon film according to claim 10, wherein the needle-shaped silicon crystallites are formed by movement of a silicide of the metal.

14. (New): A method for forming a polycrystalline silicon layer, comprising:

preparing a substrate having an amorphous silicon layer;

adding a plurality of metal atoms to the amorphous silicon layer; and

applying a heat and an electric field to the amorphous silicon layer so as to crystallize the amorphous silicon layer into a polycrystalline silicon layer using a MIC (Metal Induced Crystallization) method, the polycrystalline silicon layer including a plurality of needle-shaped silicon crystallites,

wherein the polycrystalline silicon layer has the metal atoms in the range of 2×10^{17} to 5×10^{19} atoms/cm³ and an electrical conductivity activation energy between 0.52eV and 0.71eV.

15. (New): The method according to claim 14, wherein a buffer layer is formed between the substrate and the polycrystalline silicon layer.

16. (New): The method according to claim 14, wherein the metal atoms includes one of nickel (Ni), gold (Au) and cobalt (Co).

17. (New): The method according to claim 14, wherein the metal atoms works as a catalyst for the MIC.

18. (New): The method according to claim 16, wherein a temperature range of the heat is between 400 and 500 °C.

19. (New): The method according to claim 14, wherein the needle-shaped silicon crystallites are formed by movement of nickel silicide (NiSi₂).